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ODOM, CURTIS B	
ART UNIT	**PAPER NUMBER**
2611	

DATE MAILED: 11/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/870,926	KRIEGER ET AL.	
	Examiner	Art Unit	
	Curtis B. Odom	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,13-28 and 36-49* is/are rejected.

7)☒ Claim(s) *6-12 and 29-35* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Arguments

1. Applicant's arguments filed 2/20/06 and 8/29/06 and have been fully considered but they are not persuasive. Applicant states that Farques et al. (U. S. Patent No. 6, 108, 373) does not disclose "associating a count of symbols with a value to arrive at the estimated SNR-related parameter. However, it is the understanding of the examiner that Farques does in fact disclose this feature. Farques discloses counting a number of samples (symbols) which do not correspond to optimal samples and determining (associating) a magnitude value from this count (see column 4, lines 8-14). The magnitude value allows one to arrive at an estimated SNR-related parameter by being inversely proportional to Eb/No (the SNR-related parameter), see column 4, lines 11-14.

The applicant further states there is no motivation to combine the Farques and Fukuhara (U. S. Patent No. 4, 627, 103). However, both Farques and Fukuhara determine signal-to-noise ratio related parameters from samples (see Fukuhara, column 3, lines 11-51 and Farques, column 4, lines 8-14). Further, Fukuhara discloses storing SNR related values in a memory in advance and looking-up (associating) the SNR related value in memory with calculated (subtraction) value (see column 3, lines 41-52) from the samples. Farques further discloses motivation for storing these values is advance since Farques discloses storing values used to arrive at the SNR related parameter (Eb/No) accelerates processing (see column 12-16). Therefore, it would have been obvious to one skilled in the art to store Eb/No ratios in advance in Farques as disclosed by Fukuhara in order to be able to "look-up" these values rather than calculate these values which

would accelerate processing. It is the understanding of the examiner that "looking-up" values rather than calculating values during any part of the processing would accelerate processing.

The applicant further states there is no motivation to combine Smallcomb (U. S. Patent No. 6, 484, 284) with the Farques patent. However, both patents disclose determining an SNR related parameter (see Smallcomb, column 7, line 61-column 8, line 9). Smallcomb further discloses scaling a symbol based on the SNR related parameter (see column 8, line 61-column 8, line 9) and quantizing the scaled symbol (see column 7, line 61-column 8, line 9). The applicant further states that the proposed modification would render the patent useless for its intended purpose. However, it is the understanding of the examiner that a symbol is comprised of bits. Therefore, since Smallcomb discloses scaling and quantizing bits of a symbol, it would have been obvious one skilled in the art at the time the invention to scale and quantize bits in the signal of Farques (see column 5, lines 22-30), to produce an optimal signal using the scaling (see Smallcomb, column 7, lines 26-44). Farques further discloses link is coded (see column 5, lines 22-30).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 18, 24, 25, and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Fargues et al. (previously cited in Office Action 7/27/2005).

Regarding claim 1, Fargues et al. discloses a system for estimating an SNR-related parameter comprising:

first logic (Fig. 6, block 64, column 4, lines 8-21 and column 4, lines 38-50) for determining a count of the number of received erroneous samples (symbols) in a predetermined number of expected samples that fall within one or more predetermined sample collection areas outside the optimal sample collection areas (Fig. 3 and Fig.4); and;

second logic (Fig. 6, block 63, column 4, lines 8-14 and column 6, lines 3-25) for associating the count with a magnitude value (see column 4, lines 8-14) which allows the arrival at an estimated SNR-related parameter by being inversely proportional to Eb/No (the SNR-related parameter), see column 4, lines 11-14.

Regarding claim 2, which inherits the limitations of claim 1, Fargues disclose the symbols are quadrature symbols having in-phase (I) and quadrature (Q) components (column 3, lines 44-55), the one or more collection areas are defined in relation to an I-Q plane, and the first logic determines if a received symbol falls into the one or more collection areas from the I and Q components of the symbol (Fig. 3 and Fig. 4).

Regarding claim 18, Fargues et al. discloses a system for estimating an SNR-related parameter comprising:

first means (Fig. 6, block 64, column 4, lines 8-21 and column 4, lines 38-50) for determining a count of the number of received erroneous samples (symbols) in a predetermined

number of expected samples that fall within one or more predetermined sample collection areas outside the optimal sample collection areas (Fig. 3 and Fig.4); and;

second means (Fig. 6, block 63, column 4, lines 8-14 and column 6, lines 3-25) for associating the count with a magnitude value (see column 4, lines 8-14) which allows the arrival at an estimated SNR-related parameter by being inversely proportional to Eb/No (the SNR-related parameter), see column 4, lines 11-14.

Regarding claim 24, Fargues et al. discloses a method for estimating an SNR-related parameter comprising:

determining (Fig. 6, block 64, column 4, lines 8-21 and column 4, lines 38-50) a count of the number of received erroneous samples (symbols) in a predetermined number of expected samples that fall within one or more predetermined sample collection areas outside the optimal sample collection areas (Fig. 3 and Fig.4); and;

associating (Fig. 6, block 63, column 4, lines 8-14 and column 6, lines 3-25) the count with a magnitude value (see column 4, lines 8-14) which allows the arrival at an estimated SNR-related parameter by being inversely proportional to Eb/No (the SNR-related parameter), see column 4, lines 11-14.

Regarding claim 25, which inherits the limitations of claim 24, Fargues disclose the symbols are quadrature symbols having in-phase (I) and quadrature (Q) components (column 3, lines 44-55), the one or more collection areas are defined in relation to an I-Q plane, and the determining step comprises determining if a received symbol falls into the one or more collection areas from the I and Q components of the symbol (Fig 3 and Fig. 4).

Regarding claim 41, Fargues et al. discloses a method for estimating an SNR-related parameter comprising:

a step for determining (Fig. 6, block 64, column 4, lines 8-21 and column 4, lines 38-50) a count of the number of received erroneous samples (symbols) in a predetermined number of expected samples that fall within one or more predetermined sample collection areas outside the optimal sample collection areas (Fig. 3 and Fig.4); and;

a step for associating (Fig. 6, block 63, column 4, lines 8-14 and column 6, lines 3-25) the count with a magnitude value (see column 4, lines 8-14) which allows the arrival at an estimated SNR-related parameter by being inversely proportional to Eb/No (the SNR-related parameter), see column 4, lines 11-14.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3-5 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) as applied to claims 1 and 24, in view of Fukuhara (previously cited in Office Action 4/20/2006).

Regarding claims 3-5 and 26-28, Farques et al. discloses associating or correlating the sample count with a magnitude value representing the SNR-related parameter (see column 4,

lines 8-14), which is E_B /N_0, which can be expressed in Watts or dB (column 4, lines 37-56). Fargues et al. does not disclose the SNR related parameter is E_S /N_0 expressed in dB or associating/correlating the count with a value of the SNR-related parameters using one or more look-up tables.

However, it would have been obvious to one skilled in the art at the time the invention was made that E_S/N_0 is simply E_B /N_0 divided by the number of bits per symbol. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that since E_S /N_0 is directly proportional to E_B /N_0 which can also be expressed in dB that the SNR-related parameter of Fargues et al. could have been expressed as E_S /N_0 in dB without changing the functionality of the device. Fukuhara further discloses counting a number of received sample pulses in a received signal (column 3, lines 23-40) and (see column 3, lines 41-51) associating this count (subtraction count) with a value of an SNR-related parameter (S/N ratio value) stored in memory. Based on the count, an S/N ratio is found in memory. Farques discloses storing values used to arrive at the SNR related parameter (Eb/No) accelerates processing (see column 12-16). Therefore, it would have been obvious to one skilled in the art to store Eb/No ratios in advance in Farques as disclosed by Fukuhara in order to be able to "look-up" these values rather than calculate these values which would accelerate processing. It is the understanding of the examiner that "looking-up" values rather than calculating values during any part of the processing would accelerate processing.

6. Claims 13-15, 19-21, 36-38, and 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) in view of Smallcomb (previously cited in Office Action 4/20/2006).

Regarding claims 13-15, Farques et al. discloses the limitations of claims 13-15 (see rejection of claim 1, wherein correlating is equivalent to associating), except a third logic for scaling a symbol with a scaling factor derived from a value of the SNR-related parameter; a fourth logic for quantizing the scaled symbol, wherein the SNR-related parameter is E_S/N_0 expressed in dB, wherein the scaling factor is the value of E_S/N_0 converted into linear terms.

However, it would have been obvious to one skilled in the art at the time the invention was made that E_S/N_0 is simply E_B/N_0 divided by the number of bits per symbol. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that since E_S/N_0 is directly proportional to E_B/N_0 which can also be expressed in dB that the SNR-related parameter of Fargues et al. could have been expressed as E_S/N_0 in dB without changing the functionality of the device. Smallcomb further discloses logic for scaling a symbol with a scaling factor derived from a value of the SNR-related parameter (Fig. 9, block 904, column 7, line 61-column 8, line 9); logic (Fig. 9, block 902, column 7, line 61-column 8, line 9) for quantizing the scaled symbol, wherein the scaling factor is the value of E_S/N_0 (SNR) converted into linear terms (column 7, line 61-column 8, line 9, wherein S= E_S and N= N_0 and the SNR is converted into linear terms as shown in Table 8 under "General Algorithm"). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the system of Farques et al. with the teachings of Smallcomb in order to scale and quantize the symbol to produce an optimal signal estimate using the scaling (α and β) factors (see Smallcomb, column 7, lines 26-44).

Regarding claims 19-21, Farques et al. and Smallcomb disclose all the limitations of claims 19-21 (see above rejection of claims 13-15) including the system disclosed by Farques et

al., and Smallcomb included in a system with a decoder (see Smallcomb, Fig. 9, block 901, column 7, line 60-column 8, line 8). It would have been obvious to one skilled in the art to include a decoder to recover an originally transmitted (source) signal (see Smallcomb, Fig. 2, and column 2, lines 5-9).

Regarding claims 36-38, the claimed method includes features corresponding to subject matter of the above rejection of claims 13-15, which is applicable hereto.

Regarding claims 42 and 43, the claimed method includes features corresponding to subject matter of the above rejection of claims 13-15, which is applicable hereto.

Regarding claims 44 and 45, which inherit the limitations of claim 36, Fargues et al. and Smallcomb do not disclose the method of claim 36 stored as a series of instructions on a processor readable medium including a processor configured to access and execute the series of instructions. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the method of Fargues et al. and Smallcomb as software in order to reduce cost and improve the adaptability and flexibility of the system.

7. Claims 16, 17, 39, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) in view of Smallcomb (previously cited in Office Action 4/20/2006) as applied to claims 13-15 and 38-38, and in further view of Hemmati (previously cited in Office Action 4/20/2006).

Regarding claims 16 and 17, Farques et al. and Smallcomb do not disclose the fourth logic using a uniform quantization delta or the quantization delta is optimized around a predetermined E_S/N_0 value.

However, Hemmati discloses uniform quantization wherein the quantization delta (spacing between quantization levels) is optimized around an SNR (column 10, lin59-column 8, line 11, wherein SNR is signal to noise ratio and wherein S= E_S and N= N_0). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the system of Farques et al. and Smallcomb with the teachings of Hemmati to provide uniform quantization based on SNR to provide optimal uniform quantization to avoid degradations in bit error rates at specific coding rates (see Hemmati, column 8, line 63-column 9, line 7).

Regarding claims 39 and 40, the claimed method includes features corresponding to subject matter of the above rejection of claims 16 and 17, which is applicable hereto.

8. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) in view of Smallcomb (previously cited in Office Action 4/20/2006) as applied to claims 19-21, and in further view of Classon et al. (previously cited in Office Action 4/20/2006).

Regarding claim 22, which inherits the limitations of claim 21, Farques et al. and Smallcomb do not disclose the decoder comprises a log-MAP decoder.

Classon et al. discloses a log-Map decoder to decoding symbols (column 2, lines 51-60). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the system of Farques et al. and Smallcomb with the teachings of Classon et al. since Classon et al. states that MAP decoders minimizes decoded bit error probability (column 2, lines 51-60).

Regarding claim 23, which inherits the limitations of claim 22, Fargues et al., Smallcomb and Classon et al. do not disclose a second system (receiver system) implemented as one or more

integrated circuit chips. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that systems such as receiver systems are implemented into integrated circuit chips to take advantage of the low cost and efficiency (size and implementation) of the chip.

9. Claims 46-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) in view of Smallcomb (previously cited in Office Action 4/20/2006) as applied to claims 36-38, and in further view of Sullivan (previously cited in Office Action 4/20/2006).

Regarding claims 46-49, Farques et al. and Smallcomb disclose the limitations of claims 46-49 (see rejection of claim 36) including a memory comprising one or more lookup tables (see Smallcomb, column 9, lines 4-14) and the scaling operation including one or more arithmetic operations (see Smallcomb, Fig. 9, column 7, line 60-column 8, line 9, multiplication operations). Farques et al.and Smallcomb do not disclose the system including a state machine comprising of one or more ASIC of synthesized logic for providing control.

However, Sullivan discloses a state machine which controls the memory of a system which comprises of an ASIC (Fig. 1, block 30, column 4, lines 41-51, wherein an ASIC can comprise of hardware logic (synthesized logic) to perform the software functions dislcosed). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the system of Farques et al. and Smallcomb and implement a state machine as disclosed by Sullivan since Sullivan states the state machine allows the system memory to operate at maximum efficiency (column 4, lines 48-51).

Allowable Subject Matter

10. Claims 6-12 and 29-35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Curtis Odom
November 26, 2006

JAY K. PATEL
SUPERVISORY PATENT EXAMINER